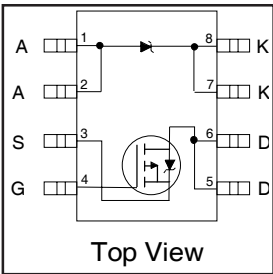


International
IR Rectifier

IRF7321D2PbF

FETKY™ MOSFET & Schottky Diode

- Co-packaged HEXFET® Power MOSFET and Schottky Diode
- Ideal For Buck Regulator Applications
- P-Channel HEXFET®
- Low V_F Schottky Rectifier
- Generation 5 Technology
- SO-8 Footprint
- Lead-Free

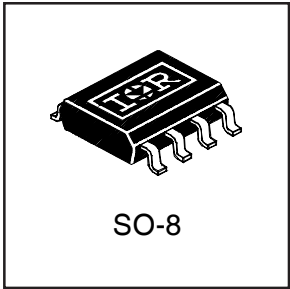


$V_{DSS} = -30V$
$R_{DS(on)} = 0.062\Omega$
Schottky $V_f = 0.52V$

Description

The **FETKY™** family of Co-packaged HEXFETs and Schottky diodes offer the designer an innovative board space saving solution for switching regulator and power management applications. Generation 5 HEXFETs utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. Combining this technology with International Rectifier's low forward drop Schottky rectifiers results in an extremely efficient device suitable for use in a wide variety of portable electronics applications.

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics. The SO-8 package is designed for vapor phase, infrared or wave soldering techniques.



Absolute Maximum Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted)

	Parameter	Maximum	Units
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-4.7	A
$I_D @ T_A = 70^\circ C$		-3.8	
I_{DM}		-38	
$P_D @ T_A = 25^\circ C$	Power Dissipation	2.0	W
$P_D @ T_A = 70^\circ C$		1.3	
	Linear Derating Factor	16	mW/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
dv/dt	Peak Diode Recovery dv/dt ②	-5.0	V/ns
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	°C

Thermal Resistance Ratings

	Parameter	Maximum	Units
$R_{\theta JA}$	Junction-to-Ambient ④	62.5	°C/W

Notes:

- ① Repetitive rating – pulse width limited by max. junction temperature (see fig. 11)
- ② $I_{SD} \leq -2.9A$, $di/dt \leq -77A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^\circ C$
- ③ Pulse width $\leq 300\mu s$ – duty cycle $\leq 2\%$
- ④ Surface mounted on FR-4 board, $t \leq 10sec$.

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MOSFET Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-30	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	0.042	0.062	Ω	$V_{GS} = -10V, I_D = -4.9A$ ③
		—	0.076	0.098		$V_{GS} = -4.5V, I_D = -3.6A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	—	—	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
g_{fs}	Forward Transconductance	—	7.7	—	S	$V_{DS} = -15V, I_D = -4.9A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	-1.0	μA	$V_{DS} = -24V, V_{GS} = 0V$
		—	—	-25		$V_{DS} = -24V, V_{GS} = 0V, T_J = 55^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = -20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = 20V$
Q_g	Total Gate Charge	—	23	34	nC	$I_D = -4.9A$
Q_{gs}	Gate-to-Source Charge	—	3.8	5.7		$V_{DS} = -15V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	5.9	8.9		$V_{GS} = -10V$, See Fig. 6 ③
$t_{d(on)}$	Turn-On Delay Time	—	13	19	ns	$V_{DD} = -15V$
t_r	Rise Time	—	13	20		$I_D = -1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	34	51		$R_G = 6.0\Omega$
t_f	Fall Time	—	32	48		$R_D = 15\Omega$, ③
C_{iss}	Input Capacitance	—	710	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	380	—		$V_{DS} = -25V$
C_{rss}	Reverse Transfer Capacitance	—	180	—		$f = 1.0\text{MHz}$, See Fig. 5

MOSFET Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-2.5	A	
I_{SM}	Pulsed Source Current (Body Diode)	—	—	-30		
V_{SD}	Body Diode Forward Voltage	—	-0.78	-1.0	V	$T_J = 25^\circ\text{C}, I_S = -1.7A, V_{GS} = 0V$
t_{rr}	Reverse Recovery Time (Body Diode)	—	44	66	ns	$T_J = 25^\circ\text{C}, I_F = -1.7A$
Q_{rr}	Reverse Recovery Charge	—	42	63	nC	$di/dt = 100A/\mu s$ ③

Schottky Diode Maximum Ratings

	Parameter	Max.	Units	Conditions
I_f (av)	Max. Average Forward Current	3.2	A	50% Duty Cycle. Rectangular Wave, $T_c = 25^\circ\text{C}$
		2.0		See Fig.14 $T_c = 70^\circ\text{C}$
I_{SM}	Max. peak one cycle Non-repetitive Surge current	200	A	5 μs sine or 3 μs Rect. pulse
		20		10ms sine or 6ms Rect. pulse
				Following any rated load condition & with V_{rrm} applied

Schottky Diode Electrical Specifications

	Parameter	Max.	Units	Conditions
V_{fm}	Max. Forward voltage drop	0.57	V	$I_f = 3.0, T_J = 25^\circ\text{C}$
		0.77		$I_f = 6.0, T_J = 25^\circ\text{C}$
		0.52		$I_f = 3.0, T_J = 125^\circ\text{C}$
		0.79		$I_f = 6.0, T_J = 125^\circ\text{C}$
I_{rm}	Max. Reverse Leakage current	0.30	mA	$V_r = 30V, T_J = 25^\circ\text{C}$
		37		$T_J = 125^\circ\text{C}$
C_t	Max. Junction Capacitance	310	pF	$V_r = 5V_{dc}$ (100kHz to 1 MHz) 25°C
dv/dt	Max. Voltage Rate of Charge	4900	V/ μs	Rated V_r

(HEXFET is the reg. TM for International Rectifier Power MOSFET's)

Power Mosfet Characteristics

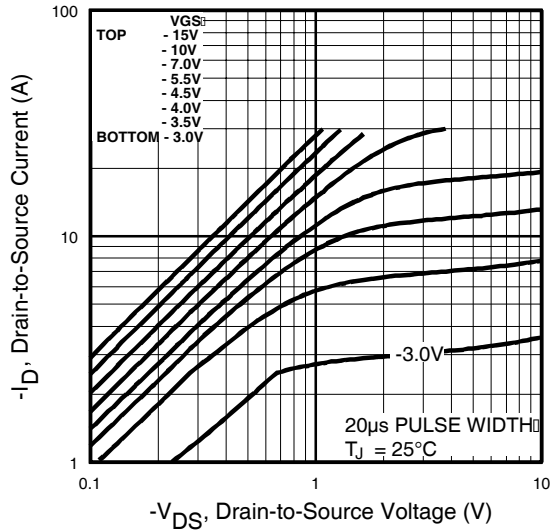


Fig 1. Typical Output Characteristics

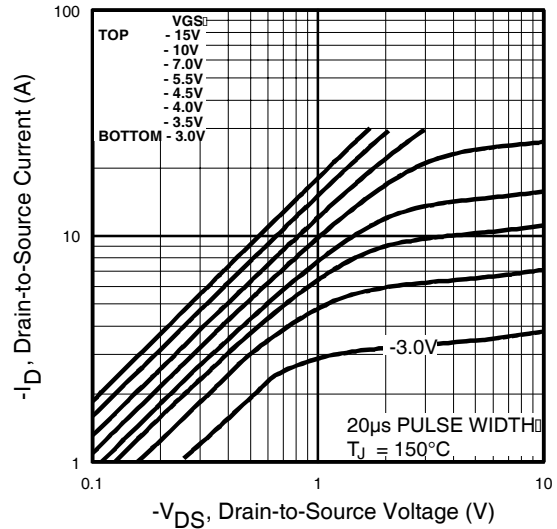


Fig 2. Typical Output Characteristics

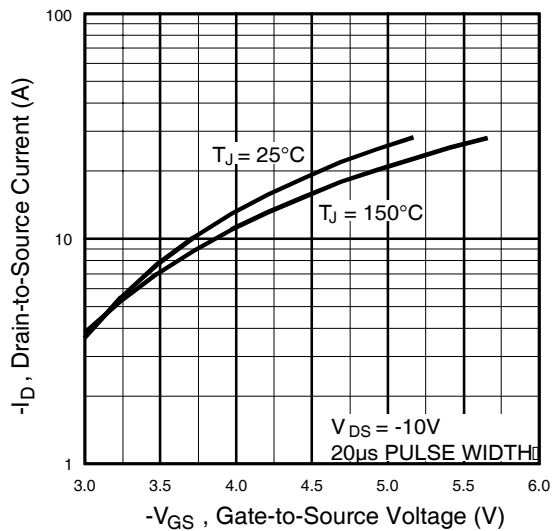


Fig 3. Typical Transfer Characteristics

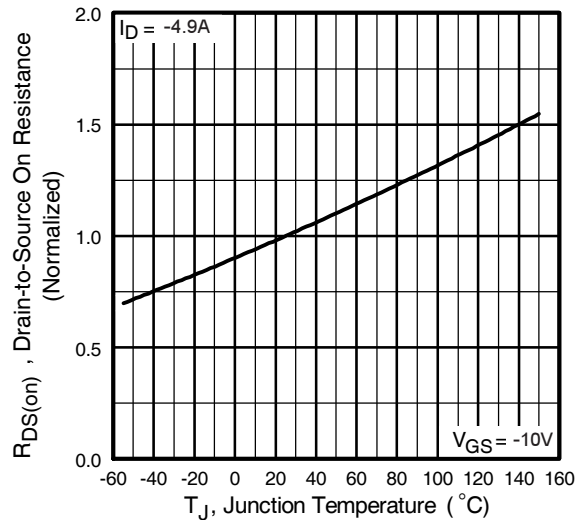


Fig 4. Normalized On-Resistance Vs. Temperature

Power Mosfet Characteristics

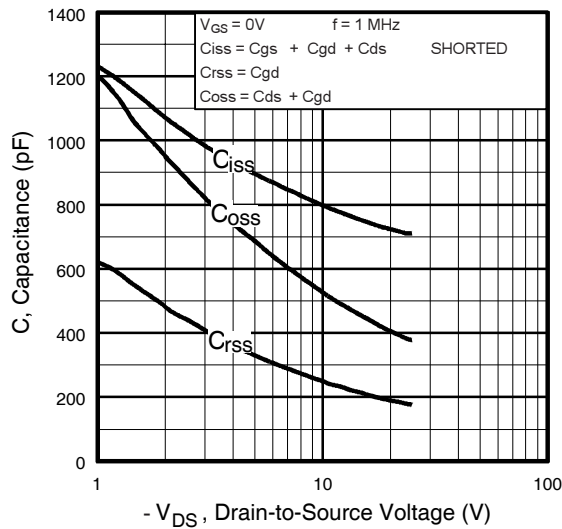


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

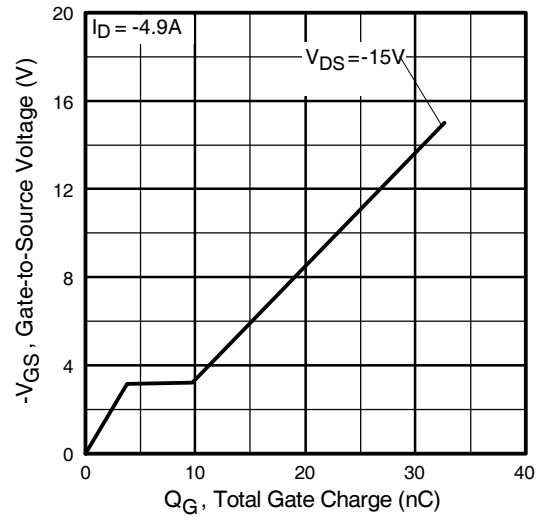


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

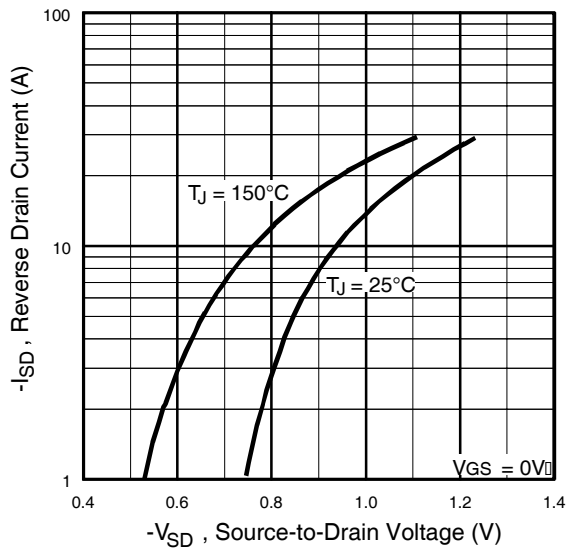


Fig 7. Typical Source-Drain Diode Forward Voltage

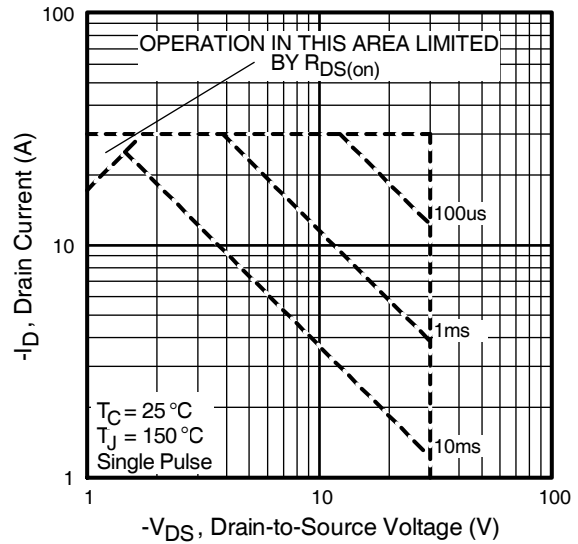


Fig 8. Maximum Safe Operating Area

Power Mosfet Characteristics

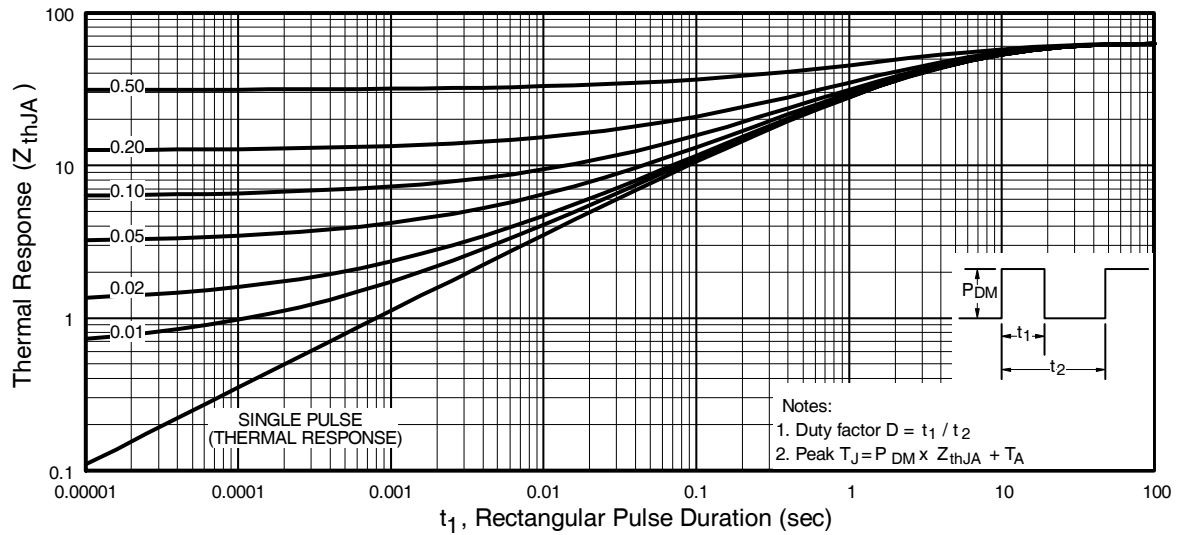


Fig 9. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

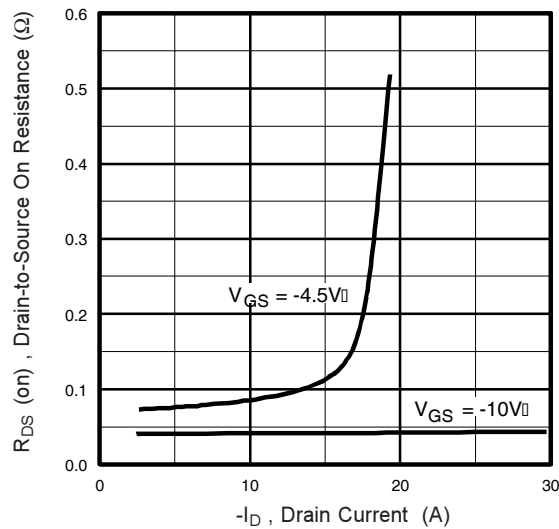


Fig 10. Typical On-Resistance Vs. Drain Current

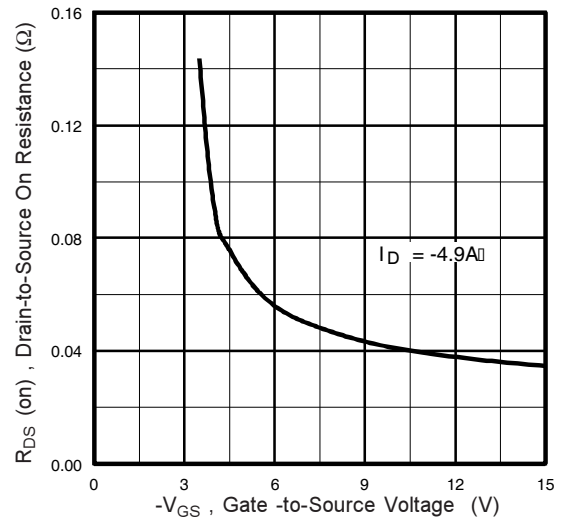


Fig 11. Typical On-Resistance Vs. Gate Voltage

Schottky Diode Characteristics

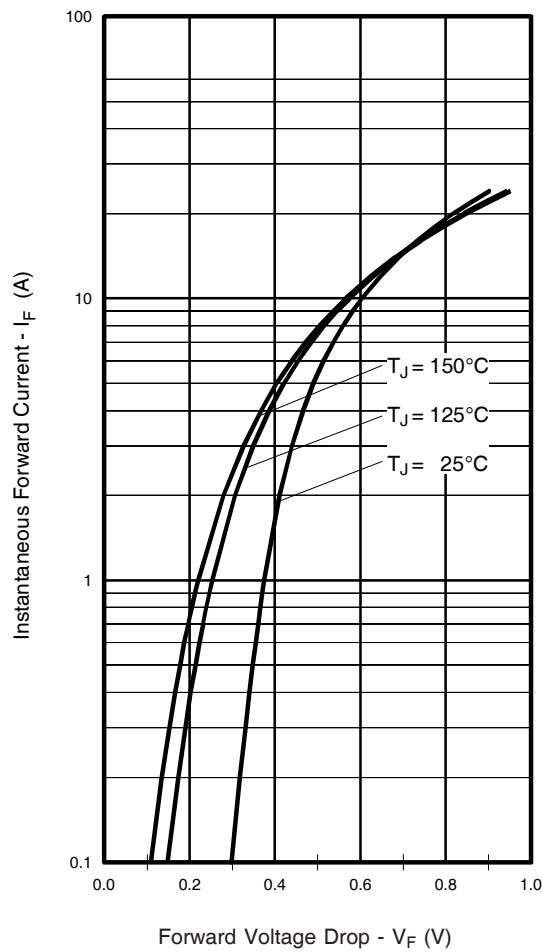


Fig. 12 - Typical Forward Voltage Drop Characteristics

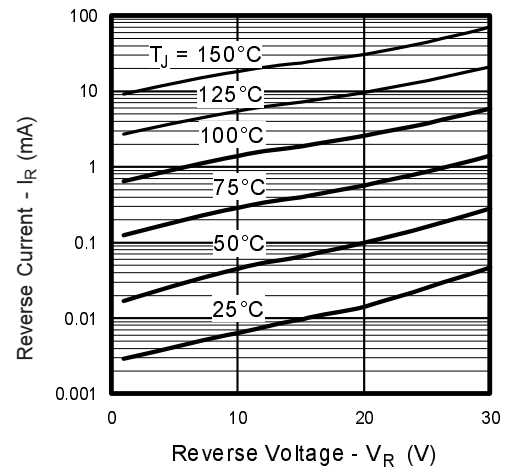


Fig. 13 - Typical Values of Reverse Current Vs. Reverse Voltage

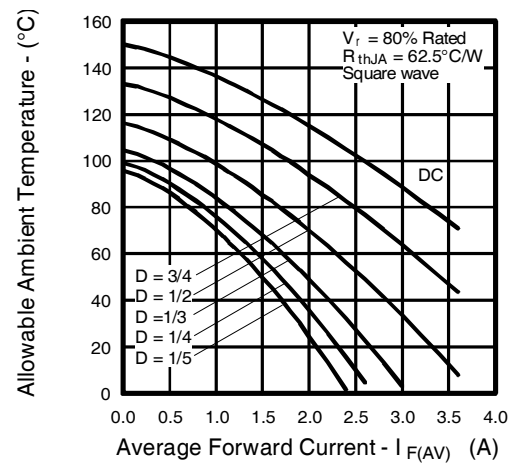
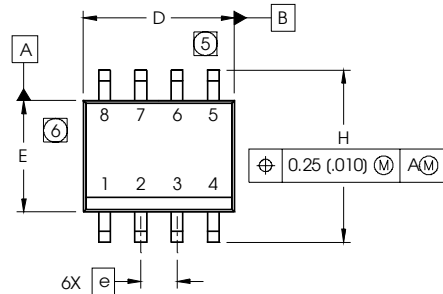
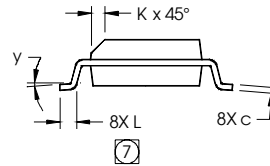
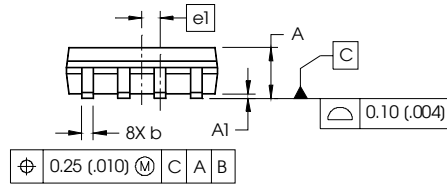


Fig. 14 - Maximum Allowable Ambient Temp. Vs. Forward Current

SO-8 (Fetky) Package Outline



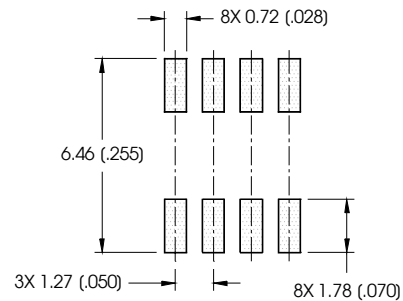
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°



NOTES:

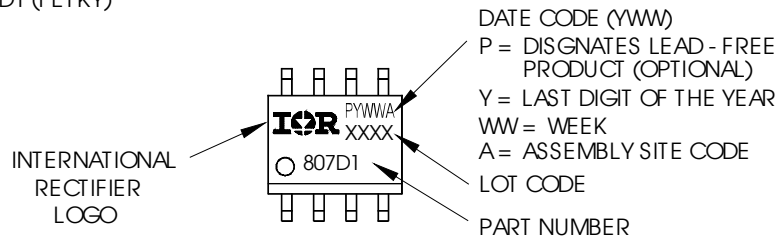
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT



SO-8 (Fetky) Part Marking Information

EXAMPLE: THIS IS AN IRF7807D1 (FETKY)

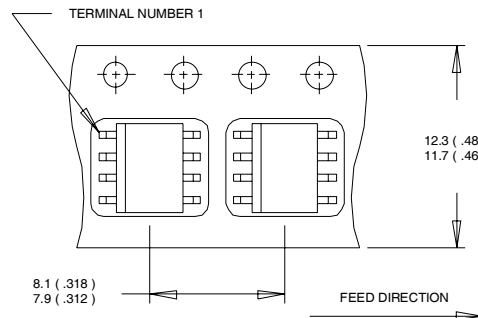


IRF7321D2PbF

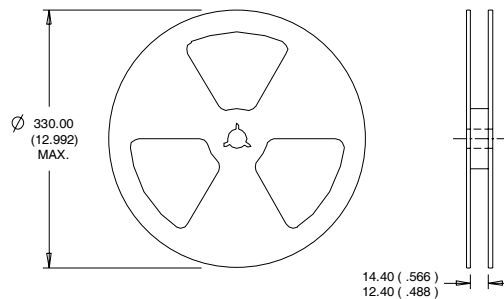
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SO-8 Tape and Reel

Dimensions are shown in millimeters (inches)



- NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
 2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS(INCHES).
 3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



- NOTES :
1. CONTROLLING DIMENSION : MILLIMETER.
 2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

Data and specifications subject to change without notice.
This product has been designed and qualified for the Consumer market.
Qualifications Standards can be found on IR's Web site.

International
IR Rectifier

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TAC Fax: (310) 252-7903

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